

APPLICATION BODY

INVENTION TITLE

Shoulder Protection System

DESCRIPTION

Best Mode

[Para 1] This is a shoulder and upper body protection system for contact and action sports. The semi-rigid and foam protection system protects the structures of the shoulder, upper chest, spine, ribs and upper back while allowing for nearly complete mobility of the shoulders, upper arms and torso. The Shoulder Protection System is designed to dissipate impact forces and redirect any residual forces to the strongest load bearing parts of the body; the upper back and medial shoulder. The semi rigid plastic covers strategically placed and anatomically specific foam padding eliminating any unnecessary padding and reducing overall weight. The collar is relatively narrow in relation to the width of the shoulders in order to provide freedom for upward movement of the outer part of the shoulders without interference. The first epaulet is fixed to the collar and the second epaulet rests on top of the first and is hinged with supporting arms from the front and the back of the collar. The hinge mechanism is designed so the wearer can move freely upon upward movement of the outer part of the shoulders, but locks when downward force is applied creating a protective channel for the shoulder and related structures.

CLAIMS

[Claim 1] The Shoulder Protection System is designed to dissipate impact forces and redirect residual forces to the strongest load bearing parts of the body, the upper back and medial shoulder. The system allows the protection above the shoulders to move up allowing the wearer nearly complete unrestricted movement of the arms. The exterior shell components are specifically designed to facilitate anatomical fit, impact resistance and vital area protection. Therefore, some exterior shell components are flexible to provide a contoured fit, increased upper body movement and shock absorption; while other components are rigid in order to provide maximum strength and impact resistance. All exterior shell components are shatter proof. All shell materials are light in weight without sacrificing impact resistance, shell integrity and vital protection.

[Claim 2] A Collar section surrounding and protecting the neck is formed using a mostly rigid material. The collar and the protective padding beneath it are

APPLICATION BODY

anatomically specifically contoured so that this collar and padding assembly rests at the base of the neck posteriorly and arcs anteriorly on the sides of the neck across the trapezius muscle and the clavicle and anteriorly across the superior aspect of the sternum. The collar and padding supports the entire protection system and is the only point of direct contact across the shoulder.

[Claim 3] The collar, from Claim 2, is formed to bridge over the clavicle (collar bone), creating a protective channel for this bone.

[Claim 4] The collar, from Claim 2, is formed to bridge over the superior aspect of the Sternum creating a protective channel.

[Claim 5] The collar, from Claim 2, is rounded on the sides of the neck in an outward facing "U" shape. The lower portion of the "U" rests on foam padding that rests squarely on the body.

[Claim 6] The collar's, from Claim 2, upper portion of the "U" on the lateral aspect provides a spring shock absorbing platform that Epaulet 1 is rigidly affixed to.

[Claim 7] The collar's, from Claim 2, upper portion of the "U" on the posterior aspect provides a cushion for the head or helmet when the neck is extended backward.

[Claim 8] The collar's, from Claim 2, contiguous rigid design in combination with the position and shape of the inside aspect of the sides of the collar create a protective space for the neck and the brachial plexus of nerves exiting the neck at Erb's Point. This collar configuration is intended to reduce neck abrasions and blunt trauma to Erb's Point that may result in "the stinger syndrome"

[Claim 9] The collar, from Claim 2, is formed to create parallel anterior and posterior articulation pivot points for the support arms of epaulet 2.

[Claim 10] The collar, from Claim 2, has ventilation holes on each inside (media)l anterior aspect to allow airflow beneath epaulet 1 and 2 on each side.

[Claim 11] The assembly of Epaulets 1, 2 and 3 course from the lateral sides of the collar at an anterior angle of between 10 and 25 degrees. This approximates the scapular angle of the human form and achieves anatomically specific protective coverage of the superior, anterior and posterior aspects of the shoulder.

[Claim 12] The epaulets, from Claim 11, location and design of 1, 2 and 3 provide for unrestricted movement of the shoulder in the adduction (flexion) and rotational planes. Both sides of the system have epaulets 1, 2 and 3.

APPLICATION BODY

[Claim 13] This 3 epaulet system, from Claim 11, creates a supported channel of space between the epaulets and the superior shoulder from the outside (or lateral?) aspect of the collar allowing the epaulets to flex and absorb the impact before the shoulder is contacted. This configuration in combination with the collar configuration of Claim 3 forms a complete protective channel for the entire length of each shoulder and collar bone (clavicle).

[Claim 14] The epaulet's, from Claim 11, anterior medial arms of both epaulet number 2s are channeled at the pivot points to allow epaulets 2 and 3 to move with the shoulder as the wearer moves.

[Claim 15] Epaulet 1, from Claim 11, is formed with ridges that correspond directly to the ridges of epaulet 2. These corresponding ridges allow epaulet 2 to sit firmly on epaulet 1 strengthening the channel that these two epaulets form over the superior aspect of each shoulder.

[Claim 16] Epaulet 2, from Claim 11, is supported by two swinging arms pivoted off of the collar. One of the arms is anterior and the other is posterior.

[Claim 17] The contour of epaulet 2, from Claim 11, allows for unrestricted superior adduction (medial flexion) of the shoulder.

[Claim 18] Epaulet 2's, from Claim 11, downward motion is restricted by epaulet 1 and 2 stop bars. One bar is attached to the anterior aspect and the other to the posterior aspect of the collar section.

[Claim 19] Epaulet 1, from Claim 11, has a stop, positioned on the posterior aspect of epaulet 1, that engages the superior aspect of the posterior arm of the epaulet 2 preventing the medial aspect of epaulet 2 from hitting the lateral neck.

[Claim 20] Epaulet 2, from Claim 11, has two anterior posterior ridges to increase strength while achieving a unique and readily discernable "look" and profile beneath a football jersey.

[Claim 21] Epaulet 3, from Claim 11, is connected to epaulet 1 by a strap allowing for it to rise up and out of the way when the arms are raised (shoulder flexion) and to return to a protective position when the arms are lowered. Each strap can be adjusted so that epaulet 3 fits properly on the player.

[Claim 22] Epaulet 3, from Claim 11, is formed to fit anatomically over the lateral superior deltoid region of the shoulder.

[Claim 23] Epaulet 3, from Claim 11, has two diagonal corrugations to increase strength.

APPLICATION BODY

[Claim 24] The Sternal Plate is anatomically specifically contoured to the pectoral muscles. The Sternal Plate contains a space (cavity) over the sternum and heart. Padding beneath the Sternal Plate is configured in an "O" shape around the plate perimeter. This configuration greatly softens any blow to this area and redistributes the impact over the anterior portion of the strong chest muscles.

[Claim 25] The Sternal Plate, from Claim 24, is horizontally hinged off of the collar's anterior section. This configuration provides a snug fit, freedom of torso rotational movement and chest expansion when breathing. This configuration reduces the "handle" available for an opponent. The hinged movement of the Sternal Plate over the frontal (anterior) aspect of the collar allows complete access to the chest if injury occurs. As necessary, the plate can be flipped completely up and out of the way.

[Claim 26] The Sternal Plate, from Claim 24, is fastened to the inferior anterior collar section with flexible strapping secured with screw and post fasteners which allow for easy Sternal Plate replacement or individual customization with a different size Sternal Plate.

[Claim 27] The Sternal Plate, from Claim 24, is ventilated with multiple holes no wider than a typical football cleat. There is no padding behind the ventilation holes or in the sternal channel itself. This allows air circulation and promotes the body's natural cooling process.

[Claim 28] The Back Plate is anatomically specifically contoured to the natural curve of the back, the scapula and latissimus dorsi muscles. The Back Plate contains a space (channel) over the spine. Padding beneath the Back Plate is configured in an "O" shape around the plate perimeter with two strips of padding on either side of the spinal channel. This configuration greatly softens any blow to this area and redistributes the impact over the posterior portion of the strong back muscles.

[Claim 29] The Back Plate, from Claim 28, is horizontally hinged off of the collar's posterior section. This configuration provides a snug fit to the specific anatomical contours of the musculature of the back, freedom of torso rotational movement and chest expansion when breathing. This configuration reduces the "handle" available for an opponent.

[Claim 30] The Back Plate, from Claim 28, is fixed superiorly to the inferior posterior aspect of the collar section with flexible strapping secured with screw and post fasteners which allow for easy Back Plate replacement or individual customization with a different size Back Plate.

APPLICATION BODY

[Claim 31] The Back Plate, from Claim 28, is vented with multiple holes no wider than a typical football cleat. There is no padding directly behind the ventilation holes. This allows air circulation and promotes the body's natural cooling process.

[Claim 32] Semi rigid posterior Wings are connected to the inferior aspect of the Back Plate on each side in opposing diagonal direction with hinged material. These flaps are positioned to provide maximum impact protection to the lower sides of the back and ribs while contouring to the back musculature.

[Claim 33] The lateral sides of the Wings, from Claim 32, secure straps that are wide, non-elastic and smooth in nature. They connect the front and the back panels at their inferior lateral aspect on each side. A quick disconnect style buckle is positioned anteriorly on each side. This configuration allows for a quick entry, a snug, comfortable fit across the back and chest areas and easier breathing. It also eliminates the abrading (scraping) the wearer.

[Claim 34] The Padding System is comprised of closed celled poly ethylene foam that does not absorb sweat but is excellent at absorbing impact. The padding will be adhered to the plastic shell in a way that the entire Shoulder Pad System may be immersed in a tub of water and cleaning/disinfecting solution for a few seconds and then air dried. The system will not retain body fluids, bacteria or smell and will be completely dry, and weigh its original dry weight, within a few hours at normal room temperature.

[Claim 35] The Padding, from Claim 34, is placed at each point of contact with the body with the protective semi rigid shell on the outside. The semi rigid shell is curved and channeled to increase the shock absorbing capacity. Padding is used on the sides of the spine to increase the protective capability of the spine channel (cavity). Additionally, padding is positioned on the outside border of the sternal plate to increase the protective capability of the cavity created in this plate to protect the breast bone (sternum) and heart.

[Claim 36] The Padding, from Claim 34, channeling and vent hole configuration are expressly designed to enhance the body's own evaporative cooling efforts.

[Claim 37] Padding, from Claim 34, under the Sternal Plate extends anteriorly to protect the pectoral muscles, intercostal muscles, ribs and AC joint.

[Claim 38] The Padding, from Claim 34, with semi rigid material sewn into the anterior aspect of the front pad further shields The AcromioClavicular (AC) Joint.